Space Weather Forecast

Issued on Thursday, 05 May 2022 at 13:07 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further X-ray flares resulting in R1/R2 radio blackouts, slight chance of R3.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been moderate over the past 24 hours, with frequent common-class activity and a trio of lower end moderate-class flares: the first at 05/1632UTC; another at 05/1948UTC; and finally one at 05/2027UTC. Peak activity was roughly equally partitioned between a large and magnetically complex group near the middle of the sun's facing side, but also AR3006, which is a more subtle smaller bipolar region at the time of writing. The larger sunspot is showing a relatively slow growth trend, with migration of intermediate spots into both the leading and trailing groups. The eastern sunspot shows less complexity visually, however this may be hiding detail due to the narrow viewing angle. These were two of four current sunspot regions, with the remainder of the front-sided roster populated by stable unipolar groups.

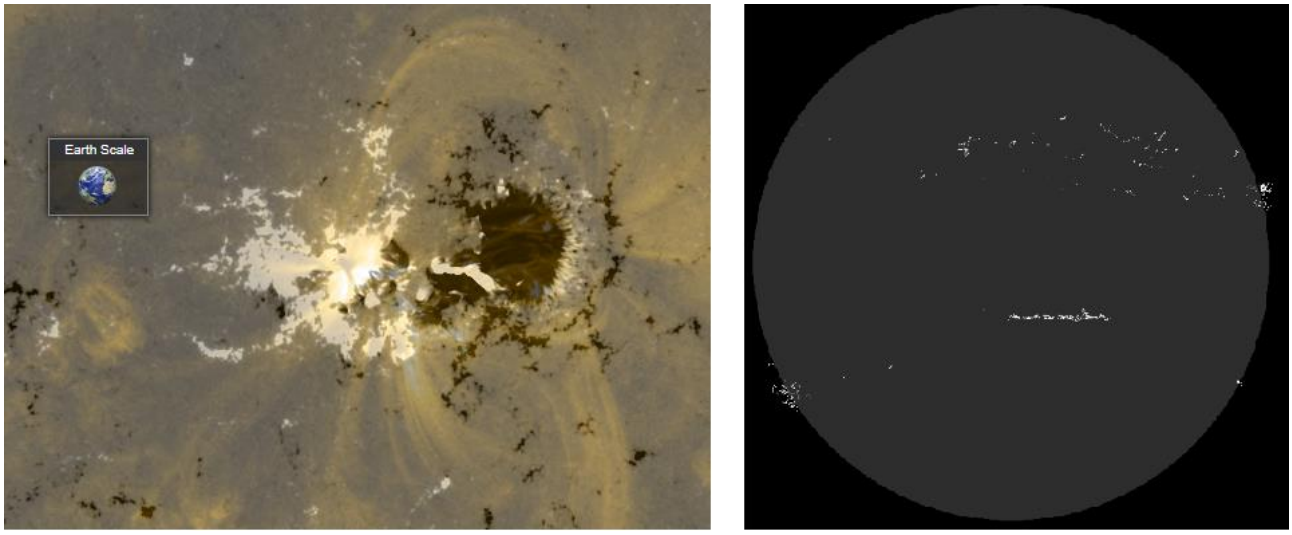

Figure 1: 05/1000UTC False colour composite extreme UV and magnetic imagery of the largest and most complex sunspot region (left). Image processing courtesy of Helioviewer.org. Also shown (right) is the location of all flares of common-class and above in the past fortnight, with the central 'stripe' tied to the largest current spot. Note also the contribution from the other active spot group near the southeastern solar horizon. Image courtesy of SIDC ROB.

There are no Earth-directed Coronal Mass Ejections (CMEs) visible in available satellite imagery.

Solar Wind / Geomagnetic Activity: The solar wind followed a slow regime, with the solar wind speed showing a very slight decline within normal background levels, while both the number of particles and their associated magnetic field were stable and unremarkable.

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The net effect of the above solar wind measures was quiet geomagnetic activity throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed in the period, despite the moderate-class X-ray flares.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a chance of further moderate-class flares (R1/R2 radio blackouts on the sunlit side of Earth) from the two largest sunspots on the sun, with a daily slight chance of strong flares (R3 radio blackouts). No significant groups leave the sun in the period, and the eastern solar horizon appears relatively subdued, therefore these risks are held constant through the forecast period.

Solar Wind / Geomagnetic Activity: No 'coronal holes' (sources of recurrent fast solar wind) and no Earth-directed CMEs feature in the forecast, and quiet geomagnetic activity is therefore most likely throughout.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, however there is a daily slight chance of S1 or above as a result of the largest sunspot's westward advance into a more prone location should it produce a suitably sizeable X-ray flare.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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